

**Notice of Allowability**

Application No.

10/730,099

Examiner

DAVID VU

Applicant(s)

TANAKA ET AL

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 07/11/05.
2. ☒ The allowed claim(s) is/are 1-19.
3. ☒ The drawings filed on 09 December 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 12/09/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 20050827.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

*David Vu*  
David Vu  
Primary Examiner  
AU 2818

## **DETAILED ACTION**

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Attorney Eckhard H. Kuesters on 08/24/05.

The applicant has been amended as follows:

Claim 20 has been cancelled.

2. Cancel claim 20.

### ***Reason for allowance***

3. Claims 1-19 are allowed.
4. The following is an examiner's statement of reason for allowance:

With regard to method claims 1-10, the prior art of record, either singularly or in combination, does not disclose or suggest at least the claim limitations of "implanting impurity ions in said second direction from diagonally above, with said first and second mask materials being formed on said main surface, to form first doped channel regions of a first conductive type

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only in said second and fifth side surfaces among said first to sixth side surfaces” as instantly claimed and in combination with the additionally claimed method steps.

With regard to method claims 11-19, the prior art of record, either singularly or in combination, does not disclose or suggest at least the claim limitations of “implanting impurity ions in said second direction from diagonally above, with said first to third mask materials being formed on said main surface, to form first doped channel regions of a first conductive type only in said second side surface of said second and third side surfaces, only in said fifth side surface of said fourth and fifth side surfaces, and only in said eighth side surface of said eighth and ninth side surfaces” as instantly claimed and in combination with the additionally claimed method steps.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

### **Conclusion**

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Pat. 5,364,810 – discloses a method of fabricating a vertical field-effect transistor and a semiconductor memory device. A vertical field-effect transistor may include a graded diffusion junction. The graded diffusion junctions may also form lightly doped drain structures for the vertical transistors and may reduce hot electron device degradation of the vertical transistors.

Channel lengths for planar field-effect transistors typically have channel regions that are

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dependent on lithographic methods, which are typically limited by the resolution limit of the lithographic method used.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is 571-272-1798. The examiner can normally be reached on Monday-Friday 8:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR, Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David Vu

Primary Examiner